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THE NEW ENGLAND BOTANICAL CLUB

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THE NEW ENGLAND POLYGONUMS OF THE SECTION AVICULARIA.

B. L. Robinson.

(Plate 35.)

It has long been known to several careful observers that our Polygonums of the Section *Avicularia* (Bird's Knotgrasses) still offer many perplexing problems. Even some of the commoner forms of this group fail to find recognition or adequate characterization in current manuals, and the section is rendered difficult alike by a general habital similarity, inconspicuous flowers without very striking differences, and by the puzzling seasonal changes through which the individual often passes from spring to autumn. Thus, at the outset nearly all forms of this section tend to be suberect, and, if the conditions of growth are at all favorable, produce upon the main stem lanceolate or more often elliptical leaves, which are relatively large (often 2 to 4 cm. long). With the successive branching, which in *P. aviculare* commonly starts at the very base, the plants in many cases quickly derive a different habit, since the branches are often quite prostrate and always bear leaves of smaller and smaller size. It thus comes about that an old sprawling specimen which has shed all its earlier foliage and retains only the much reduced leaves of the ultimate branchlets possesses so little likeness to the earlier stages of the same plant as to be easily taken for a distinct species. The difference is frequently heightened by changes of color and by the degeneration of the stipules, which are at first whole and white or often silvery, but later turn to brown bristle-formed shreds. To these matters which, however perplexing to the beginner, should not long mislead the careful student, there are added more serious diffi-

culties, which are especially apt to be shown by annuals, namely those which arise from the very unequal nourishment of the different individuals. This especially affects a group of plants which, while quite ready to luxuriate in the best of soil, are equally capable of a hardy advance into the packed earth of foot-paths or sterile sands, where they suffer every degree of inanition. Crowding also affects their manner of growth; thus the typical *P. aviculare* is normally a prostrate plant, but when crowded the individuals are often perfectly erect. Finally, the Polygonums of this section show a fondness for brackish marshes and tidal flats, where they become as one may say maritimized, taking on very gradually the thicker leaves and more fleshy character so common in halophytes. It is easy to see, therefore, why these species are confused in most herbaria.

In interpreting the maritime forms I have been especially assisted by Mr. W. P. Rich, who has devoted much attention to the group and brought together an interesting suite of specimens. I am also indebted to Prof. N. L. Britton and Dr. J. K. Small for the privilege of examining and discussing with them many specimens in the herbarium of the New York Botanical Garden, and to Mr. F. V. Coville and Dr. J. N. Rose for the loan of many sheets from the government collections at Washington. I have been kindly permitted to examine also the Polygonums in the herbaria of Brown University (including the recently acquired herbarium of Prof. W. W. Bailey), the University of Vermont, and Middlebury College, and in the private collections of Dr. E. H. Eames and Messrs. Walter Deane, E. F. Williams, E. L. Rand, and J. F. Collins. Plate 35, illustrating nearly all the forms here discussed, has been drawn with great care by Mr. F. Schuyler Matthews.

The section *Avicularia*, Meisn. Prodr. Gen. Polyg. 43, 85, is characterized by incumbent cotyledons, triquetrous achenes, axillary flowers, and 2-parted or 2-lobed stipules. None of these characters separates the section sharply from other groups in the genus, but in the case of our own northeastern species there never need be doubt in recognizing the section, the axillary flowers alone being a sufficient guide, except in *P. arenarium*, found only once on our coast.

* Achenes at maturity conspicuously exserted beyond the inclosing calyx.

+– Prostrate, maritime; achenes broadly ovate; flowers relatively large, 2 to 4 mm. in length.

P. MARITIMUM, L. Foliage very pale and glaucous, often nearly white: leaves of the branches small, narrowly oblong, very thick,

usually exceeding the short thick internodes; stipules silvery, conspicuous: sepals 5, broadly obovate, petaloid, contracted at the base, the broad roseate tips inclining to spread in fruit. — Spec. Pl. i. 361 (1753); Meisn. Prodr. Gen. Polyg. 89, & in DC. Prodr. xiv. 88; Eng. Bot. t. 2805; Gray, Man. ed. 6, 439; Small, Monog. Gen. Polyg. 100, t. 37. *P. marinum*, var. *roseum*, Pursh, Fl. 269 (1814). *P. glaucum*, Nutt. Gen. i. 254 (1818).— Sea beaches. MASSACHUSETTS: Woods Hole, 1872, *E. Palmer*; Falmouth, 1 Sept. 1894, *J. R. Churchill*, Sept. 1901, *Miss E. C. Bridge*; Nantucket, Sconset, Aug. 1875, *L. L. Dame*; Marthas Vineyard, 1865, *J. W. Robbins*; Gay Head, *S. Harris*; Edgartown, 11 Sept. 1901, *M. L. Fernald.* RHODE ISLAND; Newport, *J. W. Bailey*; Block Island, *S. T. Olney.* NEW YORK, Hook Point, Long Island, 12 Aug. 1878, *E. S. Miller.* NEW JERSEY, *A. Gray.* NORTH CAROLINA, Carolina Beach, *F. V. Coville*, no. 155. SOUTH CAROLINA, Sullivans Island, *H. W. Ravenel.* FLORIDA, *Chapman.* (Eu.) PLATE 35, FIGS. 17–19.

P. Fowleri, nov. sp. Prostratum glabrum ramosum subcarnosum pallidi-viride; foliis caulinis anguste ellipticis internodia paullo superantibus saepissime obtusis 1.2–3 cm. longis 6–9 mm. latis subtiliter venosis, eis ramorum ramulorumque gradatim minoribus; floribus subsessilibus solitariis vel binis; calice profunde 5-partito, lobis oblongis obtusis subaequalibus albescentibus vel rubescentibus basi non angustatis; achenio olivaceo 4 mm. longo a basi late ovato in rostrum acuminatum attenuato saepissime a calyce arcte amplectente valde exserto. — *P. maritimum*, Fowler, Prelim. List Pl. N. Bruns. 53; Macoun, Cat. Canad. 408 (excl. synon.); Small, Bull. Torr. Club, xix. 362, as to pl. Mt. Desert; not L. *P. Rayi*, Small, Monog. Gen. Polyg. 98, at least as to northern part of range; not Meisn. *P. Raii*, Rand & Redfield, Fl. Mt. Desert Isl. 141, 142; not Babingt. — Sandy shores. NEW BRUNSWICK, 1869, *J. Fowler* (type, in hb. Gray). ANTICOSTI, Salt Lake, 10 Aug. 1883, *J. Macoun.* QUEBEC, Rivière du Loup, 4 Aug. 1896, *E. Brainerd.* MAINE: Mt. Desert Island, Aug. 1891, *K. Furbish*; Southwest Harbor, 24 Sept. 1893, *E. L. Rand*; Great Cranberry Isle, 29 Aug. 1892, *E. L. Rand*; Broad Cove, 13 Sept. 1894, *E. L. Rand*; shore of Little Cranberry Isle, 24 July, 1899, *E. F. Williams*; Cape Newagen, Southport, 7 Aug. 1894, *M. L. Fernald.* PLATE 35, FIGS. 14, 15.

This plant, which I take pleasure in naming for its discoverer, Prof. James Fowler of Kingston, Ontario, bears such a close resemblance to *P. Raii* (or better *P. Roberti*) of the Old World that it is by no means remarkable that it has of late been confused with that species. It differs, however, in several features. The leaves are more obtuse and are not nigrescent in drying, the achenes are smaller and much more sharply beaked and the less petaloid calyx lobes are oblong, not oval.

P. ROBERTI, Loisel. Mém. Soc. Linn. Par. vi. 409 (1827); Hook.

f. & Jacks. Ind. Kew. ii. 598. *P. Raii*, Babington, Trans. Linn. Soc. Lond. xvii. 458 (1836), & Man. Brit. Bot. first six editions. *P. Rayi*, Meisn. in DC. Prodr. xiv. 88 (a mistaken orthography adopted by several American botanists but not employed by Babington notwithstanding reference to 2d ed. of his Man. by Hook. f. & Jacks. l. c.).— This species, which may be distinguished from *P. Fowleri* by the characters given above, may occur upon the coast of our middle states. There is a specimen rather closely simulating it in the herbarium of the New York Botanical Garden, collected at Portsmouth, Virginia, by Rugel, which without a re-examination I cannot pronounce upon more definitely. The name *Roberti* was according to Meisner used to cover mixed material but when previously described elements have been excluded must stand for this species. Plate 35, fig. 16.

+ + Erect; achenes lanceolate.

P. exsertum, Small. Tall, much branched: leaves lanceolate, acutish: flowers borne on slender at length exserted pedicels: calyx small, greenish, inconspicuous, much shorter than the lanceolate attenuate olivaceous much exerted achenes.— Bull. Torr. Bot. Club, xxi. 172 (1894), & Monog. Gen. Polyg. 112, t. 43.— Brackish meadows. Maine, York Harbor, *E. P. Bicknell*, acc. to Small. Rhode Island, Barrington, *S. T. Olney*. Connecticut: Orange, beach at Savin Rock, 11 Sept. 1895, *C. H. Bissell*, no. 1239; East Haven, *A. L. Winton*. New York, New York City, 24 Sept. 1894, *E. P. Bicknell*. New Jersey, Absecom, *W. Boott*. Also in the interior from Illinois to the Saskatchewan. Plate 35, figs. 12, 13.

* * Achenes nearly or quite included.

+ Branches terete or nearly so.

++ Flowers small; sepals (normally 5) greenish white mostly with a roseate tinge, 1.3 to 1.8 mm. long.

= Pedicels included in the sheaths; flowers distinctly axillary.

P. prolificum. Erectum 3–5 dm. altum ramosum vel ramosissimum; foliis lineari-oblongis crassiusculis obtusis vel plus minusve acutis in speciminibus siccatis rugulosi-venosis 1–2 cm. longis 1–4 mm. latis; stipularum laciniis setiformibus flores subsessiles valde superantibus; calyce 5-partito, lobis oblongis apice rotundatis 3 exterioribus viridibus albo-marginatis saepissime rubescentibus, in maturitate reticulati-venosis interioribus duos tenuiores albos paullo superantibus leviter cucullatis 2 mm. longis; staminibus 3; achenio triquetro brunneo acuto 2 mm. longo, faciebus lanceolati-deltoideis leviter concavis lucidis minutissime punctatis.—*P. maritimum*, Young, Cat. Fl. Oak Isl. 14 (1883), not L. *P. ramosissimum*, var. *prolificum*, Small, Bull. Torr. Club, xxi. 271 (1894), & Monog. Gen. Polyg. 114.

— MAINE, York Harbor, 16 Aug. 1893, *E. P. Bicknell.* NEW HAMPSHIRE: Rye Beach, open grassy field, 16 Aug. 1886, *W. Deane*, on salt marsh, 19 Sept. 1901, *W. P. Rich & E. F. Williams*; Hampton Falls, on salt marsh, 22 Sept. 1901, *E. F. Williams.* MASSACHUSETTS: Plum Island, on sand dunes, 4 Aug. 1899, *E. F. Williams*; Oak Island, Aug. 1877, 20 Sept. and 1 Oct. 1882, *H. A. Young*, in sand, 14 Sept. 1900, *W. Deane* (pl. 1 m. in diameter), salt marsh, 16 Sept. 1899, *W. P. Rich*; Cambridgeport, on flats of the Charles River, Oct. 1901, *B. L. Robinson & M. L. Fernald*; Dorchester, Cedar Grove, on salt marsh, 14 Sept. 1888, *W. Deane*; Milton, on salt marsh near Neponset River, 1 Sept. 1883, *W. Deane*; Plymouth Road, 11 Aug. 1878, *E. & C. E. Faxon*; Sea View, Marshfield, on shore of salt creek, 13 Oct. 1895, *E. F. Williams*; Marthas Vineyard, 20 Aug. 1865, *J. W. Robbins*; North Scituate, 6 Sept. 1897, *S. Harris.* RHODE ISLAND; Providence, 30 Aug. 1893, *J. F. Collins*; East Providence, 1879, *W. W. Bailey.* CONNECTICUT: Fairfield, 26 Sept. 1897, and 4 Sept. 1898, *E. H. Eames*; Bridgeport, banks of Cedar Creek (salt), 18 Aug. 1898, *E. H. Eames*; Orange, *C. H. Bissell*, nos. 985, 1214, 1240; Cos Cob, *C. H. Bissell*, no. 5416; Norwalk, *C. H. Bissell*, no. 5171. NEW YORK, Peconic River, L. I., 26 Aug. 1878, *E. S. Miller.* VIRGINIA, Eastville, Northampton Co., Sept. 1878, *W. M. Canby.* Also in Kansas and Nebraska, where quite indistinguishable from the Atlantic form. PLATE 35, FIG. 4.

This is one of several plants which are often confused in herbaria with *P. ramosissimum.* It differs from that species constantly in its smaller subsessile flowers and in the shape of the leaves. As found on our sea coast it does not have the yellow green color of *P. ramosissimum* but is bluish green although often whitened by a parasitic fungus. *P. prolificum* shows close affinity to *P. rurivagum*, Jord. of Europe, but differs from it in the habitually obtusish leaves, included achenes, and more robust habit.

P. AVICULARE, L. Prostrate or, especially when young or crowded, erect: leaves lanceolate, acute, acutish, or obtuse, not at all rigid or fleshy, bluish green; flowers much as in the preceding but surpassing the more hyaline remnants of the stipules; calyx rubescent sometimes deep crimson; achenes dark brown, dull, minutely granular-striate. —Spec. Pl. i. 362 (1753); Meisn. in DC. Prodr. xiv. 97; Small, Monog. Gen. Polyg. 104, t. 39. *P. Bellardi*, Small, l. c. 106, t. 40 (effuse form); Britt. & Brown, Illustr. Fl. i. 562; Britt. Man. 363; not All.— Common weed of dooryards and beaten paths, very tough, persistent, and tenacious of life. PLATE 35, FIG. 5. As noted by Meisner the species is polymorphous; with us occur the following varieties, all freely intergrading.

Var. LITTORALE, Koch. Prostrate; stems stouter, somewhat fleshy and a little lignescent towards the base: leaves oblong, thick-

ish, sometimes acute but with us more often obtuse or rounded at the apex.— Synop. Fl. Germ. 618 (1837). *P. littorale*, Link, Enum. Hort. Berol. i. 385 (1821); Meisn. in DC. Prodr. xiv. 98; Small, Monog. Gen. Polyg. 102, t. 38. The place of publication of the species is traditionally but incorrectly cited as Schrader's Journ. i. 54 (1799), although the name *littorale* appears for the first time as *P. maritimum* * *littorale*, Link in Pers. Syn. i. 439 (1805).— Sea coast. New Brunswick, Carleton, 7 Aug. 1877, *J. Fowler*. New Hampshire, New Castle, on sandy wayside near beach, 19 Sept. 1901, *W. P. Rich.* Massachusetts: Revere, Oak Island, 29 July, 1900, *W. P. Rich*; South Boston, waste land, 20 Aug. 1899, *W. P. Rich*; Scituate, gravel near beach, 8 Sept. 1901, *W. P. Rich.* Rhode Island, Providence, on cove land, 18 Sept. 1899, *J. F. Collins.* Connecticut: *H. S. Clark*, no. 8; Black Rock, 5 Aug. 1898, *E. H. Eames.* Also southward and in the interior, but less well marked. Repeated efforts to substantiate in a suite of specimens the very different characters adduced for the distinction of *P. littorale* by Koch (Linnaea, xxii. 204), Meisner (l. c.), and Small (l. c.), have failed to show them constant as distinctions or even concomitant as variables. Plate 35, fig. 8.

Var. vegetum, Ledeb. Luxuriant, more or less erect, lighter green than the typical form: leaves large, elliptical, 3 to 4 cm. in length, somewhat petioled, the margins crisped.— Fl. Ross. iii. 532 (1849); Meisn. (l. c.) 97.—Rich soil, especially in shade. Newfoundland, Quiddy Viddy, 2 Aug. 1894, *Robinson & von Schrenk.* Maine, Yarmouth on salt flats, 26 July, 1901, *E. B. Chamberlain.* Vermont, Manchester, 4 July, 1898, *M. A. Day.* This variety seems scarcely more than a rich-soil form; it is doubtless widely distributed in America. (Eu.) Plate 35, fig. 6.

The opposite tendency is shown by Var. angustissimum, Meisn. l. c. (*P. neglectum*, Bess. Enum. Fl. Volh. 45, 1821; *P. aviculare*, var. *neglectum*, Aschers. Fl. Brandenb. 51, 1864; and ? *P. aviculare*, var. *laxum*, Ledeb. l. c.) with leaves very narrowly lanceolate or linear. This narrow-leaved form is by no means rare in America but it is poorly marked and shows no constancy in the length of the leaves, degree of diffuseness, etc. Plate 35, fig. 7.

= = Filiform pedicels exserted; flowers equalling or exceeding their subtending bracts and together forming rather definite terminal racemes.

P. arenarium, Waldst. & Kit. Decumbent, branched from the base: leaves lance-linear, thickish and veiny: flowers campanulate: calyx lobes 5, oval, green with thin petaloid red margins.— Pl. Rar. Hung. i. 69, 6. 67 (1802).— Rhode Island, Providence, on cove land, 5 July, 1892, *W. W. Bailey & J. F. Collins.* A waif from the Mediterranean Region to be recognized by its narrow slightly rigid leaves, much reduced bracts, and small but attractive flowers in terminal almost naked racemes.

++ ++ Flowers larger; sepals 2 to 3 mm. long; the pedicels exserted; foliage yellowish green.

= Leaves elliptical, large for this section of the genus.

P. ERECTUM, L. Erect or decumbent, bright yellowish green, 1 to 6 dm. high; stems rather stout, much branched: leaves elliptical to obovate, 2 to 4 cm. long, 5 to 15 mm. broad: flowers yellowish green: achene often slightly exserted.— Spec. Pl. i. 363 (1753); Wats. & Coult. in Gray, Man. ed. 6, 440; Small, Monog. Gen. Polyg. 110, t. 42. *P. aviculare*, var. *erectum*, Am. auth., not Ledeb. *P. ramosissimum*, Meisn. in DC. Prodr. xiv. 97, not Michx. — Dry sunny rich soil, roadsides and especially on rubbish heaps, local. MAINE, Mechanic Falls, in streets, 19 Sept. 1897, *J. A. Allen*. VERMONT, Pownal, 8–11 Sept. 1899, *W. W. Eggleston*. MASSACHUSETTS: South Boston, waste ground, 25 Sept. 1878, *H. A. Young*; Tewksbury, 24 Sept. 1899, *E. F. Williams*; Cambridge, 30 Sept. 1884, *W. Deane*, 28 Aug. 1897, *W. P. Rich, E. F. Williams*; Watertown, 12 Sept. 1879, *C. E. Perkins*; Williamstown, 5 Sept. 1897, *J. R. Churchill*. RHODE ISLAND: East Providence, 26 Aug. 1878, *W. W. Bailey*; Providence, Cat Swamp, 2 Sept. 1894 and 15 July, 1898, *J. F. Collins*; Newport, on sandy roadside, 21 Sept. 1901, *W. P. Rich*. CONNECTICUT: Fairfield, 27 Aug. 1892, and 3 Sept. 1901, *E. H. Eames*; Bridgeport, in sandy soil, 7 Sept. 1895, *E. H. Eames*; Southington, waste ground, 1 Sept. 1897, *C. H. Bissell*; Rocky Hill, roadside in rich soil, 3 Sept. 1901, *C. H. Bissell*, no. 5458. PLATE 35, FIG. 9.

= = Leaves lanceolate, narrowed at both ends.

P. RAMOSISSIMUM, Michx. Erect, tall, paniculately branched, 3 to 10 dm. high, yellowish green: stem leaves lanceolate, mostly acute, 3 to 5 cm. long, 5 to 8 mm. broad; the rameal considerably smaller; flowers 3 to 4 mm. long, yellowish green, not at all rubescent, borne on slender mostly exserted pedicels: sepals 6, the 3 outer sharply carinate, somewhat cucullate, green with yellow margins, the 3 inner smaller, thinner, yellow or yellowish white: achene included.— Fl. i. 237 (1803); Wats. & Coult. in Gray, Man. ed. 6, 440, as to char. and western part of range; Small, Monog. Gen. Polyg. 114 in part, t. 44 (where the figure of the calyx shows but five lobes and fails to bring out their characteristic inequality).— MASSACHUSETTS, Truro, sandy bank on border of salt marsh, 30 Aug. 1899, *W. P. Rich*. PENNSYLVANIA, Allegheny County, *Zeigler*. ILLINOIS: Ringwood, *Vasey*; Fountaindale and Ogle County, *Bebb*; Bloomington, *Robinson*. IOWA: Guthrie, *J. A. Allen*; Ames, *Pammel & Combs*, no. 201. WISCONSIN, Prairie du Chien, *T. J. Hale*. MISSOURI, Atchison County, *Bush*, no. 329. OKLAHOMA, Huntsville, *L. A. Blankinship* (distributed as *P. camporum*). KANSAS, Reno County,

Hitchcock, no. 1095 at least in part. Nebraska: Rock County, *Clements*, no. 287b; Cody, Sherry County, *J. M. Bates*, no. 568 (distributed as *P. camporum*); Hooker County, *Rydberg*, no. 1579, and no. 1763 (distributed as *P. camporum*), also no. 1771 (distributed as *P. litorale*). Minnesota: Pipestone, Aug. 1895, *M. Menzel*. North Dakota, Leeds, *J. Lunnell*, nos. 62, 63. Wyoming, Blue Grass Creek, *A. Nelson*, no. 364 (distributed as *P. erectum*). Oregon, *Hall*, no. 448. Washington, Bingen, *Suksdorf*, no. 1406. Plate 35, figs. 1–3.

Many more specimens might be cited but these will be sufficient to illustrate the species. It is noteworthy that of this typical form only one specimen (Mr. Rich's plant from Truro on Cape Cod) has been seen east of western Pennsylvania. Other eastern material referred here has on examination invariably proved to be *P. prolificum* or luxuriant and diffuse *P. aviculare*, or the following readily distinguishable color form.

Forma **atlanticum**, n. f. Calyce nullo modo flavescente, lobis 5 vel 6, exterioribus albo-marginatis plus minusve rubescentibus, interioribus albidis.— Maine: Cumberland, in a hen yard, 31 Aug. 1901, *E. B. Chamberlain*; Old Orchard Beach, 29 Aug. 1898, *M. L. Fernald*, no. 2729. Massachusetts: Edgartown, margin of salt marsh, 11 Sept. 1901, *M. L. Fernald* (type of form); West Falmouth, 16 Sept. 1894, *J. R. Churchill*; North Scituate, on brackish meadow, 6 Sept. 1897, *W. P. Rich & E. F. Williams*; Cambridge, marshes of the Charles River, 4 Aug. 1901, *W. P. Rich*. Rhode Island, Providence, on cove land, 10 July, 1892, *J. F. Collins*. Connecticut: Milford, on brackish marsh, 28 Aug. 1895, *E. H. Eames*; Bridgeport, salt meadow bordering Ash Creek (stems very brittle), 8 Sept. 1901, *E. H. Eames*. This form, although always recognizable by the color of its flowers, shows no constant morphological difference from the western typical form, which as stated above has been found at one station on Cape Cod. It bears also a very striking resemblance to the true *P. Bellardi*, All., of the Old World, which scarcely differs save in its more reduced subulate and slightly rigid floral leaves.

P. Bellardi, All. Closely like the preceding form, but the upper leaves reduced to very acute short and slightly rigid bracts scarcely or not at all surpassing the flowers in their axils.—Fl. Piedm. ii. 205, t. 90, f. 2 (1785).—Of this species, which appears to be frequent and rather widely distributed in Europe and Asia, I have seen only one satisfactory American specimen. That was collected on the South Boston dumping grounds, 3 July, 1879, by *E. & C. E. Faxon*. It was probably a temporarily established waif, as it has not been found during the last twenty years. Plate 35, figs. 10–11.

+ + Branches rather sharply 3–4-angled; leaves lanceolate to linear, pointed at each end, subulate at the apex, of rather firm texture.

P. Douglasii, Greene. Leaves revolute at the margins, otherwise nearly flat, obscurely or not at all plicate: flowers soon deflexed.— Bull. Calif. Acad. Sci. i. 125 (1884); Small, Monog. Gen. Polyg. 118, t. 46— Vermont, Snake Mountain, in thin soil on sand rock, 14 Sept. 1878, and 22 Aug. 1900, *E. Brainerd*; Castleton, 22 Aug. and 12 Sept. 1897, *A. J. Grout & W. W. Eggleston*. Also westward along the Great Lakes to Rocky Mountains and Pacific Slope. Plate 35, fig. 21.

P. tenue, Michx. Leaves strongly plicate lengthwise, furrowed on each side of the midnerve: flowers erect or nearly so.—Fl. i. 238 (1803); Meisn. in DC. Prodr. xiv. 100; Small, Monog. Gen. Polyg. 122, t. 48.— Dry sandy soil, mostly in open places. Massachusetts: Melrose, 28 Sept. 1878, *H. A. Young*; Malden, 25 Oct. 1886, *F. S. Collins*; Medford, 14 Oct. 1853, *W. Boott*; Arlington, 15 Aug. 1869, *W. Boott*; Cambridge, 4 Sept. 1891, *M. L. Fernald*; Weston, Summit of Doublet Hill, 14 Oct. 1894, *E. F. Williams*; Milton, on Blue Hill, 14 Aug. 1884, *C. E. Faxon*, 11 Aug. 1895, *E. F. Williams*. Rhode Island, Providence, 10 Aug. 1877, *J. W. Congdon*; near Apponaug, 18 Aug. 1886, *J. F. Collins*. Connecticut: New Haven, *D. C. Eaton*; Stratford, on dry exposed sands, 29 Aug. 1892, and 14 Sept. 1895, *E. H. Eames*; Fairfield, 14 Aug. 1891, *E. H. Eames*; Southington, in dry fields, 28 Sept. 1898, *L. Andrews*, no. 256, and *C. H. Bissell*. Also frequent and locally abundant southward and west to Minnesota. Plate 35, fig. 20.

Gray Herbarium, Cambridge, Massachusetts.

Explanation of Plate 35. — *Polygonum ramosissimum*; fig. 1, fruiting calyx; fig. 2, a part of the inflorescence; fig. 3, a stem leaf. *P. prolificum*: fig. 4, upper part of a branch. *P. aviculare*: fig. 5, end of a branch. *P. aviculare*, var. *vegetum*: fig. 6, leaf. *P. aviculare*, var. *angustissimum*: fig. 7, leaf. *P. aviculare*, var. *littorale*: fig. 8, a part of the stem and branches. *P. erectum*: fig 9, end of a branch. *P. Bellardi*: fig. 10, inflorescence; fig. 11, a stem leaf. *P. exsertum*: fig. 12, fruiting calyx and mature achene; fig. 13, a stem leaf. *P. Fowleri*: fig. 14, a part of the stem; fig. 15, fruiting calyx and achene. *P. Roberti*: fig. 16, fruiting calyx and achene (drawn from English material). *P. maritimum*: fig. 17, branch; fig. 18, fruiting calyx and achene; fig. 19, a stem leaf. *P. tenue*: fig. 20, a stem leaf (cut transversely to show plicate character). *P. Douglasii*: fig. 21, a stem leaf. Figs. 1, 12, 15, 16, and 18, are magnified to 5 diameters; the others are natural size.

A FEW PLANTS OF THE BLUE HILLS RESERVATION.

Arthur Clark.

The Metropolitan Park Commissioners have published a Flora prepared under the direction of Mr. Walter Deane, in which most of the species noticed below are mentioned. Personal observations on the occurrence of these plants may, however, be of interest. Several additions to this list will also be made.[1]

Liparis liliifolia is found growing upon a clayey plateau at an elevation of about 400 feet, accompanied by *Anemone virginiana* and *Asclepias quadrifolia*, while a little farther on are large plants of *Geranium robertianum* with innumerable seedlings.

Pogonia verticillata is represented by three large patches, one of which is at the very top of a high hill, near the edge of a water hole.

I have thus far discovered in the Reservation only four species of Habenaria; namely, *H. tridentata* in a maple swamp, *H. lacera* bordering the edge of a pond, *H. psycodes* in three different places, and *H. blephariglottis* in a dry neglected cranberry meadow.

While tracing a brook one day I found *Corallorhiza innata* growing upon hummocks of Sphagnum under low alders, birches, and pines. There were about forty plants some of which were not more than two inches high.

Polygala polygama is quite common and grows along the park roads in the dry sand, exposed to the full rays of the burning sun. Very often the cleistogamous flowers rest upon the top of the ground and are plainly visible. *P. paucifolia* is found in rich springy woods surrounded by ferns and several species of Lycopodium. *Veratrum viride* was also found in these woods, as well as *Clintonia borealis* and *Cornus canadensis*.

Calla palustris, in a muddy swamp and shaded by a sharp hill, reaches a very unusual size.

Half way up Great Blue Hill under red cedars are several shrubs of *Ligustrum vulgare*. This is quite remarkable, so far away from

[1] When this territory was first taken as a reservation a special permit was necessary before one could botanize here. At the present time, however, one is allowed to collect flowers and fruits of specimens, but in order to obtain roots the permit is still necessary. It might be well to state, also, that the Park Commissioners have issued maps of the roads, foot-paths, brooks, etc., of the Reservation, which are of great assistance to those desiring to botanize in this vicinity.

any dwelling. The shrubs were six or eight feet high and nearly perfect in form, and when I last saw them they were completely covered with a mass of white flowers.

Higher up on this hill *Pycnanthemum linifolium* grows in large patches, and near the top *Diervilla trifida* borders the paths upon the north side, while along the road-sides at the foot of the hill a few plants of *Triosteum perfoliatum* may be seen, thickly covered with dust.

Houstonia purpurea, var. *longifolia* is not uncommon, being found in dry sandy soil in much the same surroundings as *Polygala polygama*.

One field well worthy of mention is covered with *Houstonia caerulea* growing in its perfection. When the plants are in flower the field is a mass of Houstonia blue, visible for a long distance.

A narrow but interesting strip of woods covering a portion of a small hill-side furnishes some of the most desirable plants of the whole section. *Conopholis americana*, not found elsewhere in the Reservation, and possibly now reported for the first time this side of Boston, here lifts its fleshy spikes of yellow flowers above the dried oak leaves that cover the ground on the sunny slope of this hill. Seventy-one spikes were counted here last year — a decided increase over those of 1900. *Aralia racemosa* is found sparingly here, and also *Corallorhiza multiflora*, *Goodyera pubescens*, *Actaea alba*, *Desmodium paniculatum*, *D. rotundifolium*, *Chimaphila maculata*, *Cornus canadensis* and *Lobelia spicata*.

This hill abruptly ends in a maple swamp, where a small brook winding in and out and bordered with graceful ferns, makes one of the most picturesque spots in this vicinity. Along this brook at one place, growing in deep Sphagnum, there were in 1899 seven small plants of *Microstylis ophioglossoides*; in 1900 only five were left. After careful search last season three very small specimens were all that could be found there, but upon exploring farther up the brook a collection of about one hundred plants was discovered, some of which measured more than seven inches above the Sphagnum in which they grew. I have found this species in Warquoit, Massachusetts, (a part of Falmouth) growing always under oaks and pitch pines in the grass in sandy soil. It also grows in Holbrook, Mass., in dry oak woods. I have compared the plants found in Sphagnum with those that have grown in sand, and it seems to me that Microstylis fur-

nishes a parallel to *Spiranthes cernua*, one form of which grows in meadows, another very slightly different, on uplands.

Following down the brook we come to a pond just on the line of the Reservation, where numerous species of aquatic plants are well represented. *Lobelia dortmanna* grows here in the shallow water, accompanied by unusually large plants of *Xyris caroliniana*, some of which are more than 4 feet high. On a sunny morning the blossoms of Xyris form a solid mass of yellow, from the sparkling water to the edge of the dark woods. In the grass on the bog *Utricularia cornuta* may be found, together with *Arethusa bulbosa*, and in the fall *Coreopsis trichosperma*. *Utricularia purpurea*, *U. inflata*, *Brasenia peltata*, *Limnanthemum lacunosum*, *Nymphaea odorata*, var. *minor*, and also the type are abundant in the deeper water.

A few plants of *Hottonia inflata* still linger in one of the brooks of the Reservation, while in another *Ranunculus aquatilis*, var. *trichophyllus*, with its long trailing branches, finely dissected leaves, and creamy white flowers, grows luxuriantly in the dark shaded spots.

Aphyllon uniflorum struggles for existence in the crevices of a ledge in one place. *Lupinus perennis* is also found here, although not in such numbers as in a place some distance away by the roadside, not far outside the Reservation.

Anemonella thalictroides and *Viola pubescens* grow together on a rocky, rather barren slope.

Eupatorium aromaticum, one of the most delicate of the Eupatoriums, is scattered over a hillside under stunted oaks, where is also *Ceanothus americanus*, which is rather common along the sandy roads. A few plants of *Smilacina stellata* were found growing upon a moist bank in 1899, but have not been visited since.

The following species which I have collected in the Reservation are not recorded in the Flora above mentioned:

Ranuuculus recurvatus
Geum rivale
Chrysoplenium americanum
Gratiola aurea
Utricularia vulgaris
Polygala paucifolia
Veratrum viride
Clintonia borealis
Hottonia inflata
Conopholis americana
Similacina stellata

Ames Botanical Laboratory, North Easton, Massachusetts.

CERTAIN EATERS OF MUSHROOMS.

Hollis Webster.

With three feet of snow under foot in the woods one hardly has an eye out for mushrooms. Nothing was farther from my thoughts, one bright day last February, as I was laboring up one of the hills in Jackson, New Hampshire. As I caught the end of a convenient fir branch a little a head of me to pull myself a step or two higher up the slope, I noticed something familiar fixed in a fork. Scrambling up to it, I recognized — or thought I did — the remnant of a Tricholoma, a fragment of stem and pileus, nibbled at the edges, and dry as a chip. "Squirrels," I said to myself; for I had often seen red squirrels laying up bits of mushrooms in this way. In the late autumn they are often very busy cutting and carrying off stores of mushroom food to neighboring trees and bushes, where they lodge them under protecting ends of bark, or in convenient forks. Just the object of this bestowal of the food I have been unable to make out. They leave it exposed, and, as my bit of Tricholoma showed, sometimes abandon it altogether. To stay their appetite while working, they often take a mushroom lunch, seated on a convenient stump or tussock, leaving behind them scattered crumbs, and discarded stems. I have watched them making havoc with a fine clump of *Tricholoma portentosum* which I might not have seen had they not scratched away the pine needles under which it was hidden. Has anyone ever seen gray squirrels similarly busy, or engaged in eating fungi?

Though the larvae of insects are no doubt the most confirmed mushroom-eaters, there must be many other animals that feed upon them. It would be interesting to know how many. One would suppose that rabbits might find them toothsome. Mr. Peck suggests that deer feed upon certain kinds — for instance, *Armillaria mellea*, Cattle are said to browse occasionally on *Agaricus campestris* — and perhaps on other kinds — as, for instance, a heavy, fleshy Armillaria, about which there is a tale from Maine. I know that cattle are not afraid to eat even a poisonous species, as the following instance will show.

Two summers ago in Alstead, New Hampshire, as I was passing among the scattered bushes in an upland pasture, I was escorted by

a troop of yearling heifers, that watched me inquisitively. From admiring them my eyes strayed to the ground and fell on some truly superb buttons — they can be superb — of *Amanita muscaria*. I dug one up, cut it, pointed out its characteristics to a companion, and tossed it to the ground again — right under the nose of a black heifer, that had come closer than the others — no doubt hoping for salt. She sniffed at the Amanita, put her tongue to it and then to my surprise ate it as she would an apple. I was a little alarmed, but on second thought, seeing that the mischief was done, it seemed a pity not to make the experiment more conclusive. So I tossed her a second button, which she ate as readily as she had the first. Nothing remained but to wait, or to look for a dead heifer next day. Meanwhile her companions, would serve as a "control." Next day the black heifer was as well as ever, and again sniffing for salt — or for more Amanita. It was perhaps neglectful not to have stayed by her during the hours immediately following her luncheon. Then I should have been able to say whether she suffered any inconvenience. But she certainly was unharmed. If any one wishes to repeat this experiment, I may remark, for his guidance, that mine was made without the knowledge of the owner of the heifer.

Other animals are known to eat fungi. In Gentry's "Intelligence in Plants and Animals" — not a profoundly scientific work — is an excellent photograph (opposite page 200) of a box turtle that has been feeding on what looks like a Boletus. The picture is a counterpart of what I once saw somewhere on Cape Cod. At the edge of some low woods, I came suddenly on a box turtle that had just taken a bite from the pileus of a fresh *Amanitopsis vaginata*. At least I so inferred from the shape of the bite, and from the attitude of the turtle. In the hope that he would take another mouthful, I watched him for some time, but in vain. My patience was exhausted before he stirred, or even altered the pose of his extended head. Numerous observers can, I believe, attest the fact, and one has told me that he has seen these turtles eat poisonous species.

Whether any use of fungi is made by birds I cannot say from personal observation; but I am told by an ornithologist of experience that he has never seen birds eating toadstools. Yet I have seen toadstools with the marks of the bills of birds, but they may have been after insects. I have, however, a record of one instance given me by an observer who vouches for the truth of it. His curiosity

was excited early one autumn morning by the noisy activity of a flock of crows in a field within sight of his bedroom window. He perhaps would have thought no more of the matter had not the same thing occurred on the following day. This stimulated him to investigate. On reaching the spot he found that the crows had been feeding on *Agaricus campestris* which was growing there in abundance. The evidence was unmistakable. Amused at their careless betrayal of their plunder — so unlike the usual behavior of mycophagists — he took measures to anticipate and disappoint the crows thereafter.

Cambridge, Massachusetts.

A NOTE UPON RECENT TREATMENT OF HABENARIA HYPERBOREA AND ITS ALLIES.

A. Le Roy Andrews.

Dr. Rydberg's elaboration of this puzzling section of the genus Habenaria in the Bulletin of the Torrey Botanical Club, for November, 1901 (pp. 605–632) recalls notes which I have been accumulating for several years which seem to find their explanation in it. The section has been subject to a variety of treatment, from that of Kraenzlin on the one hand, who reduces its American representatives to two species including as varieties of *Platanthera hyperborea* such distinct forms as Lindley's *Platanthera dilatata*, *P. convallariaefolia* and *P. leucostachys*, to that of Dr. Rydberg, who, maintaining the other extreme, restores the species of Lindley and other authors and adds a number of new ones until the two have become twenty-three. For these he institutes a new genus Limnorchis.

The portion of his key including the six species to which he definitely assigns stations in New England is as follows.—

Flowers green.
Spur decidedly clavate, thickened and obtuse at apex, shorter than lip.
1. *L. major* (Lange) Rydb.
Spur slender, scarcely thickened toward apex, often acutish, equalling or slightly exceeding lip.
Plant tall and stout; flowers comparatively large; sepals 4–6 mm. long.
2. *L. media* Rydb.
Plant slender, flowers small; sepals 2.5–4 mm. long.
Flowers almost erect in rather lax spike.
3. *L. Huronensis* (Nutt.) Rydb.

Flowers lateral in dense spike.
4. *L. hyperborea* (L.) Rydb.
Flowers white or nearly so.
Petals broadly lanceolate; flowers inodorous or nearly so.
5. *L. dilatata* (Pursh) Rydb.
Petals narrowly linear-lanceolate; flowers very fragrant.
6. *L. fragrans* Rydb.

Without discussing the new genus or the general treatment which is clear and illustrated throughout with drawings of the flowers, I should not be greatly surprised if our New England specimens would show forms fitting more or less well into the above classification. My own observations, of which I spoke, are these. In a cold swamp in Pownal, Vt., grows a plant, which could only be assigned to *Habenaria hyperborea*, of enormous size, frequently reaching a height of two feet and upwards, with long, densely flowered spikes. In woods below a spring, on the lower slopes of Mt. Greylock in Williamstown, Mass., by wooded roadsides in Pownal and at other points in the vicinity is to be found a very distinct form which must also be *H. hyperborea*, the latter slender, rarely a foot in height, with fewer leaves, shorter spikes, and few flowers, so much smaller in every way as to attract one's attention at once. On closer examination a decided difference was evident in the spur, that of the larger specimens being slender, filiform, acute at apex, but slightly curved, and a little longer than the lip, resembling that of *H. dilatata*, while that of the small form was shorter, more curved, seemingly thicker and more blunt. Another point of difference not mentioned in Dr. Rydberg's article, making the two almost impossible of identity, is the date of flowering. The large type as noted for several consecutive years blooms regularly in early June and by first of July has ordinarily completely passed, the smaller not beginning before late July, few flowers being open the past summer on July 21, while in 1898 they were in fresh condition, some yet unopened, on August 6. There is not such difference in condition of habitat as to explain this fact if the plants were the same.

The large form from Pownal corresponds perfectly with the description and illustration of *Limnorchis media*. The name refers to the fact that the form is intermediate between *hyperborea* and *dilatata* types, not at all to size, as Rydberg calls it the largest of the *hyperborea* group. The small type may agree with the original *Limnorchis* or *Habenaria hyperborea*. What I have taken as *Habenaria dilatata*, occurring in a peat-bog in Pownal, is plainly in its narrow petals and sepals and very sweet fragrance his *L. fragrans*. Specimens are cited

of *L. major* from Maine, of *L. media* from Vermont, of *L. Huronensis* from Vermont. Massachusetts, and Connecticut, of *L. hyperborea* from Vermont; and of *L. fragrans* from Vermont.

Mt. Pleasant, Pennsylvania.

Concerning the Plants mentioned in Young's Chronicles.— In going through the numbers of the Rhodora to record the notices of Essex County plants in my card catalog, I found the article by Mr. S. B. Parish, "Vegetation in Plymouth Three Hundred Years Ago," where the writer quotes "Young's Chronicles of the Pilgrim Fathers 1602–1625," as follows:— .... "vines everywhere, cherry trees, plum trees, ... Many kinds of herbs we found here in winter, as strawberry leaves innumerable, sorrel, yarrow, carval, brooklime, liverwort, water cresses, great store of leak and onions and an excellent kind of flax or hemp" (Rhodora, Jan. 1901, p. 17).

Referring to this often quoted paragraph, the late Dr. Charles Pickering, in a letter to me dated November 10, 1875, writes: —"My attention has recently been directed to Mourt's Relation of the Landing at Plymouth, from his having borrowed Higgeson's account of the plants around Salem, pretending that at Plymouth although 'in winter' there were growing around the landing place

'sorrel, yarrow, carvel, brooklime, liverwort, watercresses,' etc.

'sorrel, brooklime, liverwort, carvell, and watercresses'

were found in 1630 by Higgeson around Salem (Hist. col. I. p. 121.); 'carvell' (chervil) is pretty clearly Osmorrhiza longistylis, observed by myself in Paradise [a local name for a formerly lovely region near Salem] in the broken rocky place in front of Gen. Devereux's residence; perhaps the very spot where it was seen by Higgeson. 'brookime,' Veronica beccabunga, has been observed by myself in the cedar-margined outlet of Mineral-spring pond, and may have been seen there by Higgeson, especially as he describes the 'Giant's battle-field' [the scattered boulders: near there].

Higgeson also mentions 'two kinds of flowers very sweet, which they say are good to make cordage' (Apocynum androsaemifolium, and the depressed form of A. cannabinum growing around Middleton pond and pointed out to me by Oakes)."

I think that the quotation from Dr. Pickering's letter requires no comment of mine, but it is evident that the region about Salem not

Plymouth is the one which should be credited with the plants referred to in the old account.— John Robinson, Peabody Academy of Sciences, Salem, Massachusetts.

Hemicarpha in Eastern Massachusetts. — The occurrence of *Hemicarpha subsquarrosa*, Nees, in the town of Framingham, Massachusetts, was reported by the Rev. Ernest C. Smith (Rhodora, i. 98), — the first record of its discovery in Middlesex County. On October 13th, 1901, while examining with Mr. E. F. Williams the peculiar flora about Winter Pond in Winchester, eight miles northwest of Boston, I discovered several minute plants of Hemicarpha growing on a gravelly bank of the Pond at about high water mark. A week later the plant was again found, this time by Mr. Williams, growing on a sandy shore at another part of the same pond. These latter plants were of a much larger size. This discovery of the plant is of interest as adding another station in Middlesex County, — a station which also appears to be the most northern yet recorded in Massachusetts. — E. L. Rand, Boston, Massachusetts.

A Cotton-grass new to North America.— While examining some *Cyperaceae* in the Herbarium of Dr. Dana W. Fellows of Portland, Maine, I was surprised to see a strange *Eriophorum*, superficially resembling *E. virginicum*, but quite lacking the brown scales so characteristic of that plant. An examination of Dr. Fellows's specimen shows it to be *Eriophorum polystachyon*, var. *Vaillantii*, Duby in DC. & Duby, Bot. Gal. pt. 1, 487. From the common *E. polystachyon* with umbels of long-peduncled spikelets, var. *Vaillantii*, which is apparently rare in Europe, is distinguished by the sessile or very short-peduncled spikelets. From *E. virginicum*, which it habitally resembles, it is quickly separated by its lead-colored scales, silvery-white straight bristles, narrowly cuneate-obovoid obtuse achenes, and the very early fruiting season; *E. polystachyon* and its variety fruiting in June, while the rusty-scaled *E. virginicum* fruits in late summer and autumn. Dr. Fellows's material was collected June 16, 1901, on Peaks Island in Portland Harbor, where the dense-headed var. *Vaillantii* is as common as the true *Eriophorum polystachyon*.— M. L. Fernald.

Pogonatum capillare on Mt. Greylock. — In the February number of Rhodora the article by A. LeRoy Andrews giving a list of the bryophytes of the Mt. Greylock region caught my attention as I once spent a summer in that vicinity and collected on the mountain. I can add *Pogonatum capillare* Brid. to the list. A specimen, determined by Mrs. E. G. Britton and the collector, has been sent to the Herbarium of Harvard University. — Annie Morrill Smith, Brooklyn, New York.

The Climbing Fern in New Hampshire. — Some years ago fronds of *Lygodium palmatum* were brought me by friends from Winchester, New Hampshire. In September last I visited Winchester with some others who wished to see the plant growing. As we entered the village we stopped at the first house and inquired if *Lygodium palmatum* was to be found in Winchester; and we were immediately directed to a meadow beside a small stream where on a certain knoll we should find it. There were many knolls all with similar vegetation, but on only one was *Lygodium* found. There it grew luxuriantly over an area ten by fifteen feet, twining over small trees and shrubs and an abundance of *Osmunda regalis*. It was extremely difficult to obtain any of the roots, as they were intertwined with those of the other plants, especially the Osmunda. — Mrs. R. E. Metcalf, Hinsdale, New Hampshire.

A cut-leaved Cherry Birch. — The tendency in the birches to produce "cut" leaves is often shown in the cultivated form of the White Birch (*Betula pendula*, var. *dalecarlica*), but such leaves are very rarely seen in the native trees of New England. In August last, however, the writer found a small tree of *Betula lenta* exhibiting this tendency. Since such a form was unknown at the Arnold Arboretum and at the Gray Herbarium, a description of the specimen may be of interest to the readers of Rhodora.

The tree in question was about 12 feet tall, and grew at an altitude of 1200 feet, near the town of New Boston, New Hampshire. The outline was very symmetrical, although touching leaves with its neighbors, and the general aspect, including the color, marking and even odor of the bark, was that of the Cherry Birch (*Betula lenta.*) The important variation, however, was shown in the leaves, which

were oblong-ovate, slightly cordate at the base, tapering, *deeply serrate, each segment in turn being sharply toothed.* This fringed appearance of the leaves, and the gracefully horizontal "set" of the branches gave the tree a very ornamental effect. The tree was not in fruit.

Only one tree was found at the time, but further investigation may bring to light other specimens in the same locality, and in this way it will be determined whether the tree is a mere freak — to which the birch is subject — or a well established variety. — Samuel N. F. Sanford, Fall River, Massachusetts.

NOTEWORTHY PLANTS OF CONNECTICUT.

E. B. Harger.

Some twenty years ago my father and myself had *Symphytum asperrimum*, Sims, and *Vincetoxicum nigrum*, Moench, growing in our garden at Oxford. Twelve years ago we left the house and it went into the hands of persons who paid no attention to the preservation of these species. In the summer of 1900, however, I found both growing by the roadside, the former opposite the garden and the latter about two hundred feet distant. As both had increased somewhat last summer, they may probably be regarded as established.

In May, 1901, I found growing in a meadow in Oxford a clump of *Narcissus poeticus*, L., with seven flowering stalks. There is an old cellar in the same field but the house is said to have been in ruins sixty years ago so that the plant has probably maintained itself for that length of time.

A single tree of *Abies balsamea*, Miller, stands in an old pasture in Middlebury. It is nearly a quarter of a mile from the nearest house and until five years ago was as far from the nearest highway. It can hardly be native or planted but is possibly an escape from cultivation.

The preceding are, so far as I know, not previously reported from this state. The following stations for rare species may be of interest: —

Nephrodium simulatum, Davenp. In a deep swamp at Moose Hill, Oxford.

Carex pedunculata, Muhl. Fairly abundant at two stations in Oxford, about two miles apart, growing on steep wooded banks; in one

case beside the Housatonic River and in the other beside one of its tributaries.

Silene Armeria, L. A frequent escape at Seymour.

Lychnis Chalcedonica, L. Southbury.

Draba Caroliniana, Walt. Dry sandy soil near the Housatonic River, 1½ miles above Zoar Bridge, Oxford.

Arabis confinis, Wats. Lisbon. Bank of the Quinebaug River about 1 mile below Jewett City. Here are found also *Juncus Greenei*, Oakes & Tuckerm., *Antennaria Canadensis*, Greene, and what appeared to be *Polygala Nuttallii*, Torr. & Gray, but the material was too scanty for certain determination.

Agrimonia parviflora, Soland. Southbury. This species should be credited to Mr. C. H. Bissell who was first to discover it.

Euphorbia corollata, L. Two plants in grass-land, Oxford.

Hottonia inflata, Ell. Orange. One-fourth mile northeast of the village. Previously discovered by Mr. C. K. Averill.

Stachys palustris, L. Oxford. One mile south of the village.

Oxford, Connecticut.

In his Outlines of Botany[1] Mr. Leavitt has produced a textbook of more than ordinary interest. The work is based upon Dr. Gray's Lessons in Botany, a book which in its several editions has enjoyed great popularity and a continuous usefulness for more than sixty years. This unparalleled success of the Lessons has doubtless been due to its scientific accuracy, remarkable terseness, and unexcelled lucidity, rather than to its pedagogical method. This method was essentially dogmatic throughout. Indeed, the Lessons were prepared at a time when this form of teaching was the approved one, and when it was still possible to state dogmatically many points in morphology, which now in the light of more recent investigation have to be qualified by restriction and exceptions. During the last three decades there has been a great change in the methods of presenting botany in our better high schools. The memorizing of definitions from a book is no longer the aim. There is less study of abstract morphology and less attention to external form. Classifica-

[1] Outlines of Botany for the High School Laboratory and Class-room by R. G. Leavitt, A. M. 8vo, 272, pp. Prepared at the request of the Botanical Department of Harvard University, American Book Co., New York.

tion is no longer the chief end in view. Much more attention is devoted to the vital aspects of plant-life, and the different phases of this broad subject are developed largely by laboratory exercises in which the pupil is led to observe for himself.

The superiority of these more recent methods cannot be questioned. In any such change, however, there is a natural tendency to go too far, and in the enthusiasm of a good movement to pass somewhat beyond the bounds of expediency. The new methods of instructing by practical exercises and laboratory experiments, although far more effective, are much slower than the old one of memorizing. They require much more equipment and better teachers. It thus happens that recent text-books prepared as they have been with the highest ideals and very largely by university professors, have in most instances proved too comprehensive and difficult for practical application in secondary schools. Furthermore, it has been found that the results of the newer teaching in its more extreme form, are not altogether satisfactory, and that the old-fashioned study of plant members is to some extent a requisite for intelligent work in physiology, histology, and ecology.

Mr. Leavitt has combined in his Outlines the best features of the new methods of presentation while retaining what is most important in the old. Moreover, he has presented the whole with remarkable conciseness and clearness. With personal experience in high-school work he has treated his subject in full sympathy with the ambitions and limitations of high school instruction.

Many of the unexcelled illustrations of Isaac Sprague have been wisely retained from the Lessons, but these are supplemented throughout the book by many new and excellent text-figures by Messrs. C. E. Faxon and F. Schuyler Mathews.

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F. Schuyler Mathews del.

POLYGONUMS OF SECTION AVICULARIA.

get **CAREX PORTERI**, *C. saxatilis*, var. *miliaris*, and *C. Grahami* from the gravelly shores or low woods; and on Kineo he will look for *Draba incana*, var. *arabisans*, *Primula farinosa*, *Shepherdia canadensis*, *Carex capillaris*, and *Aspidium fragrans*.

In the Katahdin Iron Works region, too, the botanist will be very happy, but the great botanizing begins as he approaches southern Aroostook County. From the main line of the railroad beyond the Katahdin Iron Works district one has some splendid views of Mt. Katahdin itself with the neighboring masses of Sordnahunk and Traveller Mts. If one does not make up his mind at once to explore the giant amphitheatres and castellated ridges of Katahdin, he is no true lover of the best of botanical exploring and of inspiring mountain life. (For detailed account of Katahdin and its flora, as far as known, see RHODORA for June, 1901.)

At Crystal flag-station one should stop long enough to explore a bit of the great bog which furnishes the upper waters of Molunkus Stream. Following the railroad back half a mile he will find himself surrounded by masses of *Betula pumila*, *Lonicera oblongifolia*, and other northern shrubs, with an herbaceous flora including *Parnassia caroliniana*, **DROSERA LINEARIS**, *Valeriana sylvatica*, *Aster junceus*, *Pyrola rotundifolia*, var. *uliginosa*, *Tofieldia glutinosa*, *Carex chordorhiza* and *C. livida*.

If he wishes to stop for some time in the region (and who does not) he can have good accommodations at Island Falls; and there, near the Mattawamkeag River, he will get the local **ANTENNARIA RUPICOLA**, *Hieracium vulgatum*, *Erigeron acris*, and *Halenia deflexa*. In the river, itself, and in Mattawamkeag Lake he will revel in September, dragging up such prizes as *Myriophyllum Farwellii*, *M. alterniflorum*, and *Potamogeton obtusifolius*.

When Houlton is reached one should make up his mind to stop at some of the numerous villages between there and the Aroostook River, for the Cedar (Arbor-vitae) swamps of the Meduxnakeag and the Presque Isle valleys are the homes of *Cypripedium spectabile*, *Microstylis monophyllos*, *Carex vaginata*, and scores of other species of absorbing interest.

The valleys of the Aroostook and the main St. John — for instance at Fort Fairfield, Van Buren, Fort Kent, and St. Francis — furnish one of the most striking floras of New England. There among other species one will get **THALICTRUM CONFINE** and **T. OCCIDENTALE**, **OXYTROPIS CAMPESTRIS**, var. **JOHANNENSIS**, *Hedysarum boreale*, **TANACETUM HURONENSE**, **PRENANTHES RACEMOSA** and **P. MAINENSIS**, *Gentiana Amarella*, var. *acuta*, **PEDICULARIS FURBISHIAE**, **SALIX GLAUCOPHYLLA** and **S. ADENOPHYLLA**, **GOODYERA MENZIESII**, *Juncus alpinus*, var. *insignis* and **J. TENUIS**, var. **WILLIAMSII**, *Triglochin palustre*, *Scirpus Clintonii*, **CAREX CRAWEI** and **C. BICOLOR**, *Equisetum palustre* and *E. variegatum*, and *Lycopodium sitchense*.

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If he has spent hours about home searching for something really new to him, he will start with delight as he sees the fields and banks of blue *Aster Lindleyanus* just above Oldtown, or the clearings crimson in September with the drooping tassels of *Polygonum Careyi*. Or, if he is fortunate enough to get off in May, he will be greeted from recent clearings by fragrant white masses of Sweet Coltsfoot, *Petasites*.

Just beyond Alton, he cannot help longing to explore the indefinite miles of Sphagnum swamp, and if he looks to the West, he will see a beautiful little round pond bordered by gnarled Black Spruces, which he instantly knows must be covered with the tiny Mistletoe, *Arceuthobium pusillum*. Alton bog is well worth exploring, but it is only a small area compared with the hundreds of miles of such country through North-central Maine, and unless one has plenty of time he should save that and his enthusiasm for "farthest north."

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